In the Claims

Sub K1

78. (thrice amended) [An attachment member for making electrical connections for testing unpackaged semiconductor dice, said attachment member]

A test apparatus for testing a semiconductor die comprising:

a plate for retaining the die;

a substrate mounted to the plate for making electrical connections with the die;

[for mounting within a test apparatus]

a clamping mechanism mounted to the plate configured to [retain the substrate and a single die and to] bias the die against the substrate with a [selected contact] force;

a contact [formed] on the substrate comprising a surface and [including] a plurality of spaced raised portions projecting from [a] the surface, the [of the contact said] raised portions dimensioned to penetrate into a pad on the die at the [selected contact] force to [with] a penetration depth equal to a height of the raised portions but less than a thickness of the pad, [while] the surface dimensioned to [of the contact] limit[s] further penetration of the [contact] raised portions into the pad at the [selected contact] force; and

a conductive trace formed on the substrate in electrical communication with the contact.

79. (thrice amended) The apparatus of [attachment member as claimed in] claim 78 wherein the surface is dimensioned to penetrate into the pads at a second force which is about two to ten times the force.

[substrate and contact comprise silicon.]

80. (thrice amended) The apparatus of [attachment member as claimed in] claim 78 wherein the conductive trace comprises a second contact configured to electrically engage a second pad on the plate.
[raised portions comprise points.]

81. (thrice amended) The apparatus of [attachment member as claimed in] claim 78 wherein the raised portions have a height of about 5000Å.

J1 cont'd.

82. (thrice amended) The apparatus of [attachment member as claimed in] claim 78 wherein the pad comprises a bondpad recessed within a passivation layer formed on the die.

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87. (twice amended) [A member for making electrical connections for testing unpackaged semiconductor dice, said member]

Sub K7

A test apparatus for testing a semiconductor die comprising:

a plate for retaining the die, the plate comprising a plurality of external leads;

J2

a substrate mounted on the plate for making electrical connections with the die;
[for mounting within a test apparatus]

a clamping mechanism mounted to the plate and configured [to retain a single unpackaged die and] to bias the die against the substrate with a [selected contact] force;

a plurality of contacts [formed] on the substrate, the contacts having surfaces and [including] a plurality of spaced raised portions projecting from [a] the surfaces [of the contact, said raised portions shaped and] dimensioned to penetrate into [a bond] pads on the die [at the selected contact force] with [a] penetration depths equal to [a]

heights of the raised portions but less than [a] thicknesses of the [bond] pads while the surfaces of the contacts limit[s] further penetration of the [contact] raised portions into the [bond] pads, the force selected to be greater than a first force at which the raised portions penetrate the pads but less than a second force at which the surfaces penetrate the pads; and

[at the selected contact force; and]

a plurality of conductive traces [formed] on the substrate in electrical communication with the contacts and with the external leads.

88. (twice amended) The apparatus of [member as claimed in] claim 87 wherein the heights of the raised portions [have a height of] are at least 5000Å.

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90. (twice amended) The apparatus of [member as claimed in] claim 87 wherein the second force is from two to ten times the first force.

[substrate and contact comprise silicon.]

91. (twice amended) The apparatus of [member as claimed in] claim 87 further comprising [a second] bond pads [in electrical communication with] on the conductive trace. [for wirebonding to the conductive trace.]

92. (twice amended) [A member for making temporary electrical connections for testing unpackaged semiconductor dice, said member]

A test apparatus for testing a semiconductor die comprising:

a plate for retaining the die, the plate comprising a plurality of external leads;

a substrate mounted to the plate for making electrical connections with the die;

[for mounting within a test apparatus]

a clamping mechanism mounted to the plate and configured to [retain a single unpackaged die having a bondpad and to] bias the die and the substrate together with a [selected contact] force; [therebetween;]

a plurality of contacts [formed] on the substrate aligned with pads on the die, the contacts including a plurality of spaced raised portions projecting from [a] surfaces of the contacts, the [said] raised portions [shaped and] dimensioned to penetrate into the [bond] pads at the [selected contact] force by a penetration depth equal to a height of the raised portions but less than a thickness of the [bond] pads while the surfaces of the contacts limit[s] further penetration of the contacts into the [bond] pads, the force selected to be greater than a first force at which the raised portions penetrate the pads but less than a second force at which the surfaces penetrate the pads, the second force selected to be from two to ten times the first force; and

[at the selected contact force; and]

a plurality of conductive traces formed on the substrate in electrical communication with the contacts and with the external leads.

93. (twice amended) The apparatus of [member as claimed in] claim 92 wherein the surfaces are substantially aligned in a Z axis direction.

[substrate and contact comprise silicon.]

96. (twice amended) The apparatus of [member as claimed in] claim 92 wherein the raised portions comprise points.